

CLAIMS:

1. An encapsulation composition, comprising:

(A) an encapsulate, encapsulated in:

(B) a glassy matrix,

5 wherein said glassy matrix is selected from the group consisting of:

(a) a composition, comprising:

(a<sub>1</sub>) 5 to 95 % by weight, based on the total weight of said composition

(a), of a first n-octenylsuccinic anhydride-modified starch; and

(a<sub>2</sub>) 5 to 90 % by weight, based on the total weight of said composition

10 (a), of a second n-octenylsuccinic anhydride-modified starch; and

(a<sub>3</sub>) 0 to 45 % by weight, based on the total weight of said composition

(a), of a component selected from the group consisting of sugars, polyols, corn syrup solids, and mixtures thereof,

with the proviso that said first n-octenylsuccinic anhydride-modified starch and

15 said second n-octenylsuccinic anhydride-modified starch are different from each other;

(b) a composition, comprising:

(b<sub>1</sub>) 5 to 95 % by weight, based on the total weight of said composition

(b), of a first food polymer;

(b<sub>2</sub>) 5 to 90 % by weight, based on the total weight of said composition

20 (b), of a second food polymer; and

(b<sub>3</sub>) 0 to 45 % by weight, based on the total weight of said composition

(b), of a component selected from the group consisting of sugars, polyols, corn syrup solids, and mixtures thereof,

wherein said first food polymer is an n-octenylsuccinic anhydride-modified starch,

25 and

wherein said second food polymer is selected from the group consisting of exudate gums, bacterial gums, extract gums, seed gums, pectins, dextrins, pregelatinized starches, agar agar, polydextrose, hydrogenated starch hydrolyzates, modified celluloses, seaweed hydrocolloid extracts, proteins, fractionated proteins, hydrolyzed proteins, and chitosan;

(c) a composition, comprising:

(c<sub>1</sub>) 5 to 95 % by weight, based on the total weight of said composition

(c), of a first food polymer;

(c<sub>2</sub>) 5 to 90 % by weight, based on the total weight of said composition

(c), of a second food polymer; and

(c<sub>3</sub>) 0 to 45 % by weight, based on the total weight of said composition

(c), of a component selected from the group consisting of sugars, polyols, corn syrup solids, and mixtures thereof,

wherein said first food polymer and said second food polymer are selected from the group consisting of exudate gums, bacterial gums, extract gums, seed gums, pectins, dextrins, maltodextrins, pregelatinized starches, agar agar, polydextrose, hydrogenated starch hydrolyzates, modified celluloses, seaweed hydrocolloid extracts, proteins, fractionated proteins, hydrolyzed proteins, and chitosan,

with the proviso that said first food polymer and said second food polymer are different from each other; and

(d) a composition, comprising:

(d<sub>1</sub>) 5 to 95 % by weight, based on the total weight of said composition

(d), of a first food polymer;

(d<sub>2</sub>) 5 to 70 % by weight, based on the total weight of said composition

(d), of a second food polymer;

(d<sub>3</sub>) 5 to 70 % by weight, based on the total weight of said composition

(d), of a third food polymer; and

(d<sub>4</sub>) 0 to 45 % by weight, based on the total weight of said composition

(d), of a component selected from the group consisting of sugars, polyols, corn

5 syrup solids, and mixtures thereof,

wherein said first food polymer and said second food polymer are selected from the group consisting of exudate gums, bacterial gums, extract gums, seed gums, pectins, dextrins, pregelatinized starches, agar agar, polydextrose, hydrogenated starch

hydrolyzates, modified celluloses, seaweed hydrocolloid extracts, proteins, fractionated

10 proteins, hydrolyzed proteins, and chitosan, and

wherein said third food polymer is selected from the group consisting of n-octenylsuccinic anhydride-modified starches, exudate gums, bacterial gums, extract gums, seed gums, pectins, dextrins, maltodextrins, pregelatinized starches, agar agar, polydextrose, hydrogenated starch hydrolyzates, modified celluloses, seaweed

15 hydrocolloid extracts, proteins, fractionated proteins, hydrolyzed proteins, and chitosan,

with the proviso that said first food polymer, said second food polymer, and said third food polymer are all different from each other.

2. The composition of Claim 1, which has at least one glass transition temperature  
20 >30°C.

3. The composition of Claim 1, which has at least one glass transition temperature  
> 40°C.

25 4. The composition of Claim 1, which has two glass transition temperatures.

5. The composition of Claim 1, wherein said matrix (B) is (a) a composition comprising:

(a<sub>1</sub>) 5 to 95 % by weight, based on the total weight of said composition (a), of a first n-octenylsuccinic anhydride-modified starch; and

(a<sub>2</sub>) 5 to 90 % by weight, based on the total weight of said composition (a), of a second n-octenylsuccinic anhydride-modified starch; and

(a<sub>3</sub>) 0 to 45 % by weight, based on the total weight of said composition (a), of a component selected from the group consisting of sugars, polyols, corn syrup solids, and mixtures thereof,

with the proviso that said first n-octenylsuccinic anhydride-modified starch and said second n-octenylsuccinic anhydride-modified starch are different from each other.

6. The composition of Claim 5, wherein said matrix (B) is a composition comprising 1 to 45 % by weight, based on the total weight of said composition (a), of said component selected from the group consisting of sugars, polyols, corn syrup solids, and mixtures thereof.

7. The composition of Claim 1, wherein said matrix (B) is (b) a composition comprising:

(b<sub>1</sub>) 5 to 95 % by weight, based on the total weight of said composition (b), of a first food polymer;

(b<sub>2</sub>) 5 to 90 % by weight, based on the total weight of said composition (b), of a second food polymer; and

(b<sub>3</sub>) 0 to 45 % by weight, based on the total weight of said composition (b), of a component selected from the group consisting of sugars, polyols, corn syrup solids, and mixtures thereof,

wherein said first food polymer is an n-octenylsuccinic anhydride-modified starch,  
5 and

wherein said second food polymer is selected from the group consisting of exudate gums, bacterial gums, extract gums, seed gums, pectins, dextrans, pregelatinized starches, agar agar, polydextrose, hydrogenated starch hydrolyzates, modified celluloses, seaweed hydrocolloid extracts, proteins, fractionated proteins, hydrolyzed proteins, and  
10 chitosan.

8. The composition of Claim 7, wherein said matrix (B) is a composition comprising 1 to 45 % by weight, based on the total weight of said composition (b), of said component selected from the group consisting of sugars, polyols, corn syrup solids, and  
15 mixtures thereof.

9. The composition of Claim 1, wherein said matrix (B) is (c) a composition comprising:

(c<sub>1</sub>) 5 to 95 % by weight, based on the total weight of said composition (c), of a  
20 first food polymer;

(c<sub>2</sub>) 5 to 90 % by weight, based on the total weight of said composition (c), of a second food polymer; and

(c<sub>3</sub>) 0 to 45 % by weight, based on the total weight of said composition (c), of a component selected from the group consisting of sugars, polyols, corn syrup solids, and  
25 mixtures thereof,

wherein said first food polymer and said second food polymer are selected from the group consisting of exudate gums, bacterial gums, extract gums, seed gums, pectins, dextrins, maltodextrins, pregelatinized starches, agar agar, polydextrose, hydrogenated starch hydrolyzates, modified celluloses, seaweed hydrocolloid extracts, proteins, 5 fractionated proteins, hydrolyzed proteins, and chitosan, and

with the proviso that said first food polymer and said second food polymer are different from each other.

10. The composition of Claim 9, wherein said matrix (B) is a composition 10 comprising 1 to 45 % by weight, based on the total weight of said composition (c), of said component selected from the group consisting of sugars, polyols, corn syrup solids, and mixtures thereof.

11. The composition of Claim 1, wherein said matrix (B) is (d) a composition 15 comprising:

(d<sub>1</sub>) 5 to 95 % by weight, based on the total weight of said composition (d), of a first food polymer;

(d<sub>2</sub>) 5 to 70 % by weight, based on the total weight of said composition (d), of a second food polymer;

20 (d<sub>3</sub>) 5 to 70 % by weight, based on the total weight of said composition (d), of a third food polymer; and

(d<sub>4</sub>) 0 to 45 % by weight, based on the total weight of said composition (d), of a component selected from the group consisting of sugars, polyols, corn syrup solids, and mixtures thereof,

wherein said first food polymer and said second food polymer are selected from the group consisting of exudate gums, bacterial gums, extract gums, seed gums, pectins, dextrins, pregelatinized starches, agar agar, polydextrose, hydrogenated starch hydrolyzates, modified celluloses, seaweed hydrocolloid extracts, proteins, fractionated proteins, hydrolyzed proteins, and chitosan, and

wherein said third food polymer is selected from the group consisting of n-octenylsuccinic anhydride-modified starches, exudate gums, bacterial gums, extract gums, seed gums, pectins, dextrins, maltodextrins, pregelatinized starches, agar agar, polydextrose, hydrogenated starch hydrolyzates, modified celluloses, seaweed hydrocolloid extracts, proteins, fractionated proteins, hydrolyzed proteins, and chitosan, with the proviso that said first food polymer, said second food polymer, and said third food polymer are all different from each other.

12. The composition of Claim 11, wherein said matrix (B) is a composition comprising 1 to 45 % by weight, based on the total weight of said composition (d), of said component selected from the group consisting of sugars, polyols, corn syrup solids, and mixtures thereof.

13. The composition of Claim 1, wherein said encapsulate is selected from the group consisting of medications, pesticides, vitamins, preservatives, and flavoring agents.

14. The composition of Claim 13, wherein said encapsulate is a flavoring agent.

15. The composition of Claim 14, wherein said flavoring agent is selected from the group consisting of natural extracts, oleoresins, essential oils, protein hydrolyzates, aqueous reaction flavors, and compounded flavors.

5           16. An encapsulate composition, prepared by a process comprising:

(i) mixing a matrix composition (B) with a liquid plasticizer and an encapsulate (A) in an extruder, to obtain a melted mixture comprising encapsulate (A) and matrix (B); and

(ii) extruding said melted mixture, to obtain said composition,

10           wherein said encapsulate (A) is encapsulated in a glassy matrix of said matrix composition (B), and

wherein said matrix composition (B) is selected from the group consisting of:

(a) a composition, comprising:

(a<sub>1</sub>) 5 to 95 % by weight, based on the total weight of said composition

15           (a), of a first n-octenylsuccinic anhydride-modified starch; and

(a<sub>2</sub>) 5 to 90 % by weight, based on the total weight of said composition

(a), of a second n-octenylsuccinic anhydride-modified starch; and

(a<sub>3</sub>) 0 to 45 % by weight, based on the total weight of said composition

20           (a), of a component selected from the group consisting of sugars, polyols, corn syrup solids, and mixtures thereof,

with the proviso that said first n-octenylsuccinic anhydride-modified starch and said second n-octenylsuccinic anhydride-modified starch are different from each other;

(b) a composition, comprising:

(b<sub>1</sub>) 5 to 95 % by weight, based on the total weight of said composition

25           (b), of a first food polymer;



(b<sub>2</sub>) 5 to 90 % by weight, based on the total weight of said composition

(b), of a second food polymer; and

(b<sub>3</sub>) 0 to 45 % by weight, based on the total weight of said composition

(b), of a component selected from the group consisting of sugars, polyols, corn

5 syrup solids, and mixtures thereof,

wherein said first food polymer is an n-octenylsuccinic anhydride-modified starch,

and

wherein said second food polymer is selected from the group consisting of

exudate gums, bacterial gums, extract gums, seed gums, pectins, dextrins, pregelatinized

10 starches, agar agar, polydextrose, hydrogenated starch hydrolyzates, modified celluloses,

seaweed hydrocolloid extracts, proteins, fractionated proteins, hydrolyzed proteins, and

chitosan;

(c) a composition, comprising:

(c<sub>1</sub>) 5 to 95 % by weight, based on the total weight of said composition

15 (c), of a first food polymer;

(c<sub>2</sub>) 5 to 90 % by weight, based on the total weight of said composition

(c), of a second food polymer; and

(c<sub>3</sub>) 0 to 45 % by weight, based on the total weight of said composition

(c), of a component selected from the group consisting of sugars, polyols, corn

20 syrup solids, and mixtures thereof,

wherein said first food polymer and said second food polymer are selected from

the group consisting of exudate gums, bacterial gums, extract gums, seed gums, pectins,

dextrins, maltodextrins, pregelatinized starches, agar agar, polydextrose, hydrogenated

starch hydrolyzates, modified celluloses, seaweed hydrocolloid extracts, proteins,

25 fractionated proteins, hydrolyzed proteins, and chitosan,

with the proviso that said first food polymer and said second food polymer are different from each other; and

(d) a composition, comprising:

(d<sub>1</sub>) 5 to 95 % by weight, based on the total weight of said composition

5 (d), of a first food polymer;

(d<sub>2</sub>) 5 to 70 % by weight, based on the total weight of said composition

(d), of a second food polymer;

(d<sub>3</sub>) 5 to 70 % by weight, based on the total weight of said composition

(d), of a third food polymer; and

10 (d<sub>4</sub>) 0 to 45 % by weight, based on the total weight of said composition

(d), of a component selected from the group consisting of sugars, polyols, corn syrup solids, and mixtures thereof,

wherein said first food polymer and said second food polymer are selected from the group consisting of exudate gums, bacterial gums, extract gums, seed gums, pectins, dextrins, pregelatinized starches, agar agar, polydextrose, hydrogenated starch  
15 hydrolyzates, modified celluloses, seaweed hydrocolloid extracts, proteins, fractionated proteins, hydrolyzed proteins, and chitosan, and

wherein said third food polymer is selected from the group consisting of n-octenylsuccinic anhydride-modified starches, exudate gums, bacterial gums, extract  
20 gums, seed gums, pectins, dextrins, maltodextrins, pregelatinized starches, agar agar, polydextrose, hydrogenated starch hydrolyzates, modified celluloses, seaweed hydrocolloid extracts, proteins, fractionated proteins, hydrolyzed proteins, and chitosan,

with the proviso that said first food polymer, said second food polymer, and said third food polymer are all different from each other.

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17. The composition of Claim 16, which has at least one glass transition temperature  $>30^{\circ}\text{C}$ .

18. The composition of Claim 16, which has at least one glass transition  
5 temperature  $>40^{\circ}\text{C}$ .

19. The composition of Claim 16, which has two glass transition temperatures.

20. The composition of Claim 16 wherein said encapsulate is selected from the  
10 group consisting of medications, pesticides, vitamins, preservatives, and flavoring agents.

21. The composition of Claim 20, wherein said encapsulate is a flavoring agent.

22. The composition of Claim 21, wherein said flavoring agent is selected from  
15 the group consisting of natural extracts, oleoresins, essential oils, protein hydrolysates, aqueous reaction flavors, and compounded flavors.

23. A process for preparing an encapsulation composition, said process comprising:

20 (i) mixing a matrix composition (B) with a liquid plasticizer and an encapsulate (A) in an extruder, to obtain a melted mixture comprising encapsulate (A) and matrix (B); and

(ii) extruding said melted mixture, to obtain said composition,

wherein said encapsulate (A) is encapsulated in a glassy matrix of said matrix  
25 composition (B), and

wherein said matrix composition (B) is selected from the group consisting of:

(a) a composition, comprising:

(a<sub>1</sub>) 5 to 95 % by weight, based on the total weight of said composition

(a), of a first n-octenylsuccinic anhydride-modified starch; and

5 (a<sub>2</sub>) 5 to 90 % by weight, based on the total weight of said composition

(a), of a second n-octenylsuccinic anhydride-modified starch; and

(a<sub>3</sub>) 0 to 45 % by weight, based on the total weight of said composition

(a), of a component selected from the group consisting of sugars, polyols, corn syrup solids, and mixtures thereof,

10 with the proviso that said first n-octenylsuccinic anhydride-modified starch and said second n-octenylsuccinic anhydride-modified starch are different from each other;

(b) a composition, comprising:

(b<sub>1</sub>) 5 to 95 % by weight, based on the total weight of said composition

(b), of a first food polymer;

15 (b<sub>2</sub>) 5 to 90 % by weight, based on the total weight of said composition

(b), of a second food polymer; and

(b<sub>3</sub>) 0 to 45 % by weight, based on the total weight of said composition

(b), of a component selected from the group consisting of sugars, polyols, corn syrup solids, and mixtures thereof,

20 wherein said first food polymer is an n-octenylsuccinic anhydride-modified starch,  
and

wherein said second food polymer is selected from the group consisting of exudate gums, bacterial gums, extract gums, seed gums, pectins, dextrins, pregelatinized starches, agar agar, polydextrose, hydrogenated starch hydrolyzates, modified celluloses,

seaweed hydrocolloid extracts, proteins, fractionated proteins, hydrolyzed proteins, and chitosan;

(c) a composition, comprising:

(c<sub>1</sub>) 5 to 95 % by weight, based on the total weight of said composition

5 (c), of a first food polymer;

(c<sub>2</sub>) 5 to 90 % by weight, based on the total weight of said composition

(c), of a second food polymer; and

(c<sub>3</sub>) 0 to 45 % by weight, based on the total weight of said composition

(c), of a component selected from the group consisting of sugars, polyols, corn

10 syrup solids, and mixtures thereof,

wherein said first food polymer and said second food polymer are selected from the group consisting of exudate gums, bacterial gums, extract gums, seed gums, pectins, dextrans, maltodextrins, pregelatinized starches, agar agar, polydextrose, hydrogenated starch hydrolyzates, modified celluloses, seaweed hydrocolloid extracts, proteins,

15 fractionated proteins, hydrolyzed proteins, and chitosan,

with the proviso that said first food polymer and said second food polymer are different from each other; and

(d) a composition, comprising:

(d<sub>1</sub>) 5 to 95 % by weight, based on the total weight of said composition

20 (d), of a first food polymer;

(d<sub>2</sub>) 5 to 70 % by weight, based on the total weight of said composition

(d), of a second food polymer;

(d<sub>3</sub>) 5 to 70 % by weight, based on the total weight of said composition

(d), of a third food polymer; and

(d<sub>4</sub>) 0 to 45 % by weight, based on the total weight of said composition

(d), of a component selected from the group consisting of sugars, polyols, corn syrup solids, and mixtures thereof,

wherein said first food polymer and said second food polymer are selected from  
5 the group consisting of exudate gums, bacterial gums, extract gums, seed gums, pectins, dextrins, pregelatinized starches, agar agar, polydextrose, hydrogenated starch hydrolyzates, modified celluloses, seaweed hydrocolloid extracts, proteins, fractionated proteins, hydrolyzed proteins, and chitosan, and

wherein said third food polymer is selected from the group consisting of n-  
10 octenylsuccinic anhydride-modified starches, exudate gums, bacterial gums, extract gums, seed gums, pectins, dextrins, maltodextrins, pregelatinized starches, agar agar, polydextrose, hydrogenated starch hydrolyzates, modified celluloses, seaweed hydrocolloid extracts, proteins, fractionated proteins, hydrolyzed proteins, and chitosan,

with the proviso that said first food polymer, said second food polymer, and said  
15 third food polymer are all different from each other.

24. The process of Claim 23, wherein said encapsulate is selected from the group consisting of medications, pesticides, vitamins, preservatives, and flavoring agents.

20 25. The process of Claim 24, wherein said encapsulate is a flavoring agent.

26. The process of Claim 25, wherein said flavoring agent is selected from the group consisting of natural extracts, oleoresins, essential oils, protein hydrolyzates, aqueous reaction flavors, and compounded flavors.